

Claims

1. An infrared-reflecting material (10) for covering objects, comprising
 - 5 a) at least one metallized water-vapor-permeable ply (20) having a top surface (22) and a bottom surface (24) and having
 - b) at least one ply (30) that is air permeable, drapable and convective and has a three-
10 dimensionally transmissive structure, wherein the convective ply (30) is disposed on one or more of the surfaces (22, 24) of the metallized ply (20).
- 15 2. The material (10) according to claim 1 wherein the convective ply (30) has a top surface (32) and an air-permeable sheetlike structure (40) is disposed on this surface (32).
- 20 3. The material (10) according to claim 1 wherein the convective ply (30) has a top surface (32) and the top surface (32) is formed by an air-permeable sheetlike structure (40).
- 25 4. The material (10) according to claim 1 wherein the convective ply (30) is disposed on the top surface (22) of the metallized ply (20).
5. The material (10) according to claim 1 wherein the
30 convective ply (30) is not less than 2 mm in thickness.
6. The material (10) according to claim 1 wherein the
35 convective ply (30) has a structure that is riblike, honeycomblike, pimples, netlike, beflocked, foamlike.
7. The material (10) according to claim 1 wherein the convective ply (30) comprises spacers (34)

perpendicular to one or more of the surfaces (22, 24) of the metallized ply (20).

- 5 8. The material (10) according to claim 1 wherein the convective ply (30) is a three-dimensional pimpled formed-loop knit (36).
- 10 9. The material (10) according to claim 1 wherein the convective ply (30) is selected from materials comprising polypropylene, polyester, polyurethane, polyethylene, polyamide and combinations thereof.
- 15 10. The material (10) according to claim 1 wherein the convective ply (30) has an air permeability in the z direction of not less than $100 \text{ l/m}^2\text{s}$ at a pressure of 10 Pa.
- 20 11. The material (10) according to claim 1 wherein the convective ply (30) has an air permeability in the x and y direction of not less than $50 \text{ l/m}^2\text{s}$ at a pressure of 10 Pa.
- 25 12. The material (10) according to claim 2 and 3 wherein the sheetlike structure (40) has an air permeability of not less than $50 \text{ l/m}^2\text{s}$ at a pressure of 10 Pa.
- 30 13. The material (10) according to claim 1 wherein the sheetlike structure (40) is selected from the group of materials comprising polypropylene, silk, polyethylene, polyamide, polyester, polyurethane and combinations thereof.
- 35 14. The material according to claim 1 wherein the metallized ply (20) comprises a metallized textile.
15. The material (10) according to claim 1 wherein the metallized ply (20) comprises a metallized

membrane.

16. The material (10) according to claim 14 wherein
the metallized membrane is watertight and water
vapor permeable.
17. The material according to claim 1 wherein the
metallized ply (20) comprises a microporous water-
vapor-permeable polymeric membrane (50) having a
top surface (51), a bottom surface (53) and in-
between pores (52) and a metal layer (55) covers
one or more of the surfaces of the membrane and
exposed sub-surface portions thereof.
18. The material (10) according to claim 17 wherein
the metal layer (55) is selected from the group
consisting of aluminum, gold, silver, copper,
zinc, cobalt, nickel, platinum, palladium, tin,
titanium, their alloys, oxides, nitrides,
hydroxides and combinations thereof.
19. The material (10) according to claim 17 wherein
the microporous membrane (50) is selected from the
group consisting of expanded polytetrafluoro-
ethylene (ePTFE), polyethylene, polypropylene,
polyurethane and blends thereof.
20. The material (10) according to claim 1 wherein the
metallized ply (20) comprises a metallized
microporous polymeric membrane of expanded poly-
tetrafluoroethylene.
21. The material (10) according to claim 20 wherein
the ePTFE membrane comprises a polymeric layer
which is water vapor permeable, continuous and
hydrophilic.
22. The material (10) according to claim 1 that forms
at least part of a clothing or tenting material.

23. A garment (12) composed of an infrared-reflecting material (10), said infrared-reflecting material (10) comprising at least one metallized water-vapor-permeable ply (20) having a top surface (22) and a bottom surface (24) and having at least one ply (30) that is air permeable, drapable and convective and has a three-dimensionally transmissive structure, wherein the convective ply (30) is disposed on one or more of the surfaces (22, 24) of the metallized ply (20).
24. The garment (12) according to claim 23 wherein the convective ply (30) has a top surface (32) and an air-permeable sheetlike structure (40) is disposed on this surface (32).
25. The garment (12) according to claim 23 wherein the convective ply (30) has a top surface (32) and an air-permeable sheetlike structure (40) is disposed on this top surface (32).
26. The garment (12) according to claim 23 that has an outer side and an inner side and wherein the top surface (22) of the metallized ply (20) faces the outer side and the convective ply (30) is disposed atop the top surface (22) which faces the outer side.
27. The garment (12) according to claim 23 wherein the convective ply (30) is not less than 2 mm in thickness.
28. The garment (12) according to claim 23 wherein the convective ply (30) has a structure that is riblike, honeycomblake, pimples, netlike, deflocked, foamlike.
29. The garment (12) according to claim 23 wherein the

convective ply (30) comprises spacers (34) perpendicular to one or more of the surfaces (22, 24) of the metallized ply (20).

- 5 30. The garment (12) according to claim 23 wherein the convective ply (30) is a three-dimensional pimpled formed-loop knit (36).
- 10 31. The garment (12) according to claim 23 wherein the convective ply (30) is selected from the group of materials comprising polypropylene, polyester, polyurethane, polyethylene, polyamide and combinations thereof.
- 15 32. The garment (12) according to claim 23 wherein the convective ply (30) has an air permeability in the z direction of not less than $100 \text{ l/m}^2\text{s}$ at a pressure of 10 Pa.
- 20 33. The material (10) according to claim 23 wherein the convective ply (30) has an air permeability in the x and y directions of not less than $50 \text{ l/m}^2\text{s}$ at a pressure of 10 Pa.
- 25 34. The garment (1) according to claim 24 and 25 wherein the sheetlike structure (40) has an air permeability of not less than $50 \text{ l/m}^2\text{s}$ at a pressure of 10 Pa.
- 30 35. The garment (12) according to claim 23 wherein the metallized ply (20) comprises a metallized textile.
- 35 36. The garment (12) according to claim 23 wherein the metallized ply (20) comprises a metallized membrane.
37. An arrangement for camouflaging objects against thermal images, said arrangement comprising a

metallized water-vapor-permeable ply (20) having a top surface (22) and a bottom surface (24), characterized in that means (30) for temperature control and for convective heat exchange are provided atop one or more of the surfaces (22, 24) of the metallized ply (20).

38. The arrangement according to claim 37 wherein the means (30) comprises an air-permeable drapable convective ply (30) having a three-dimensional transmissive structure.

39. The arrangement according to claim 38 wherein the convective ply (30) comprises spacers (24) perpendicular to one or more of the surfaces (22, 24) of the metallized ply (20).